Lawrence Berkeley National Laboratory

Enabling World-Leading Science Through Infrastructure Renewal

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For Berkeley Lab CAG Meeting

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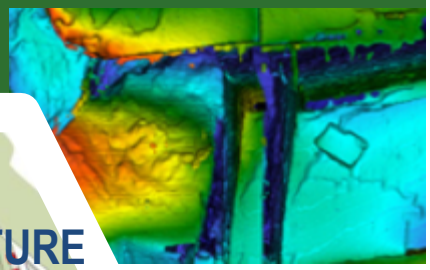
Campus Facilities

- Oldest of the national laboratories (founded in 1931 as the UC Berkeley Radiation Laboratory)
  - 202 acres
  - 5 national user facilities
  - 97 buildings, 22 trailers, 7 off-site leases
  - 2 M GSF of built space (including off-site locations)

Lab-wide Strategic Priorities 2018

BIOLOGICAL and ENVIRONMENTAL SCIENCE at BAYVIEW

BREAKTHROUGH SCIENCE at the EXASCALE



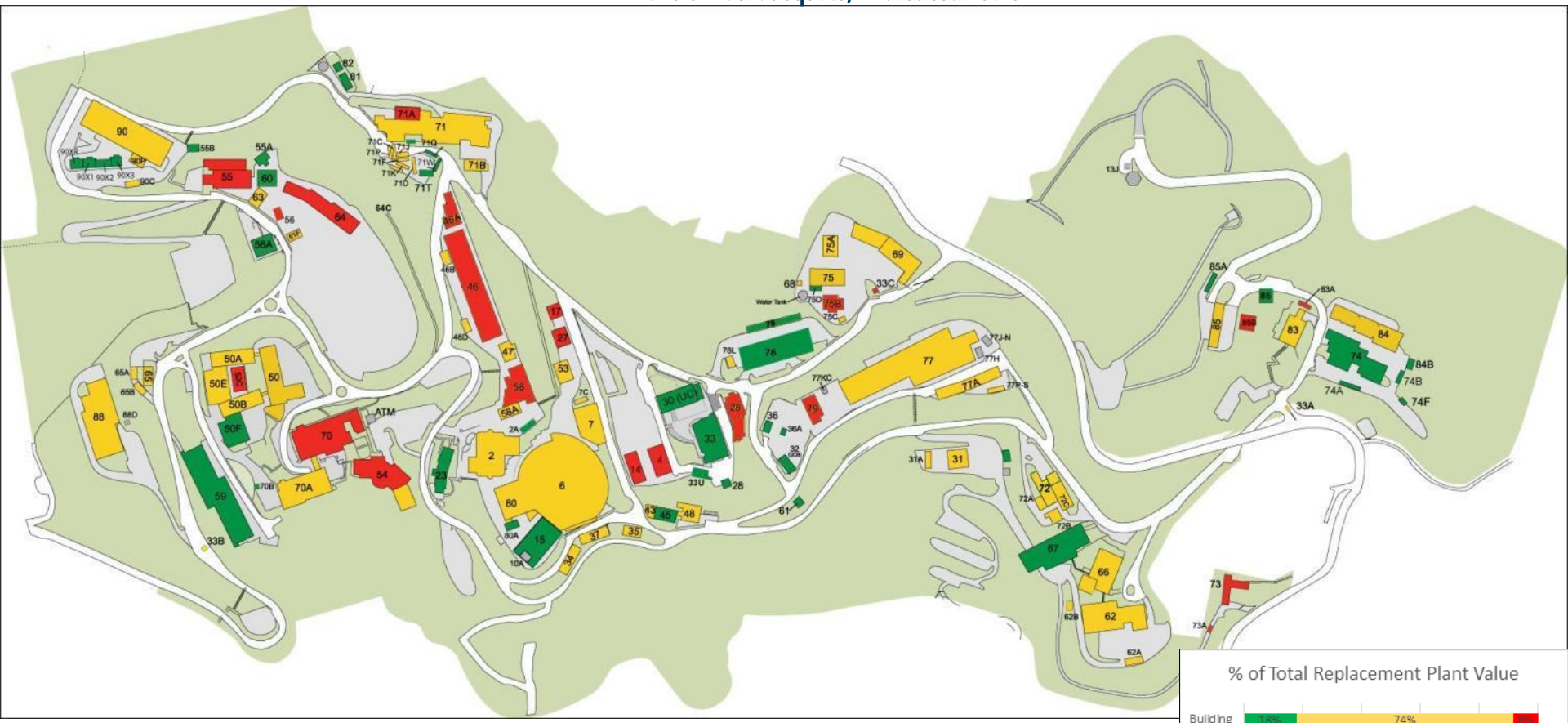
SCIENCE with AN UPGRADED ADVANCED LIGHT SOURCE

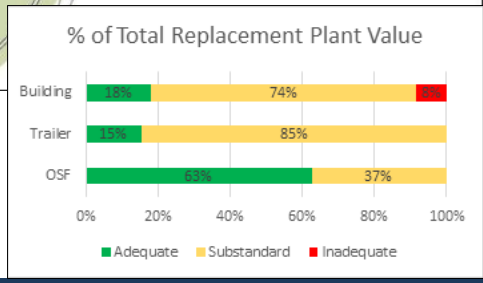
DISCOVERY SCIENCE in FUNDAMENTAL PHYSICS

Aging Infrastructure

97 Buildings: 37% adequate, 49% substandard, 12% inadequate

22 Trailers: 23% adequate, 77% substandard





Adequate: Asset is fully capable of performing its current mission (DOE Order 430.1C)

Substandard: Asset has deficiencies that limit mission performance

Inadequate: Asset's major deficiencies significantly impair mission performance

Strategic Infrastructure Vision

Objective 1

Construct new facilities to advance research for the nation

- New capability
- Colocation of science
- Lease avoidance

Objective 2

Reclaim sites for future development

- Characterize and remove legacy waste
- Demolish facilities that no longer support the DOE mission

Objective 3

Transform utility infrastructure for expansion and reliability

- Increase capacity and replace at-risk systems

Objective 4

Modernize existing facilities and systems for evolving scientific needs

- Increase capabilities of unique facilities for the user community

Strategic Infrastructure Vision

Berkeley Lab Strategic Priorities	Objective 1 Construct new facilities to advance research for the nation	Objective 2 Reclaim sites for future development	Objective 3 Transform utility infrastructure for expansion and reliability	Objective 4 Modernize existing facilities and systems for evolving scientific needs
Science with an upgraded ALS	✓	✓	✓	✓
Science at Bayview	✓	✓	✓	
Discovery Physics		✓	✓	✓
Science at the Exascale			✓	✓
Infrastructure Renewal	✓	✓	✓	✓

Historical and Projected Timeline

New/Potential Facilities for Science

Chu Hall (Solar Energy Research Center)

B33 General Purpose Laboratory

Integrative Genomics Building

BioEPIC Building (if approved & funded)

Potential Future Science

2009 | 2011 | 2013 | 2015 | 2017 | 2019 | 2021 | 2023 | 2025 | 2027 | 2029

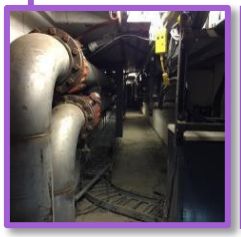
Reclaim Sites

Bayview Demo B51 Bevatron

Old Town Demo B25, B40/41, Trailers 90

Old Town Demo B5, B16/16A

Old Town Demo B4/7/7C/14



Future Objective: Demo Tunnels & Remediate Soils

Bayview Site Ongoing Remediation (all phases)

Arrows denote planned occupancy/ completion years

Laboratory Cleanup Program Overview

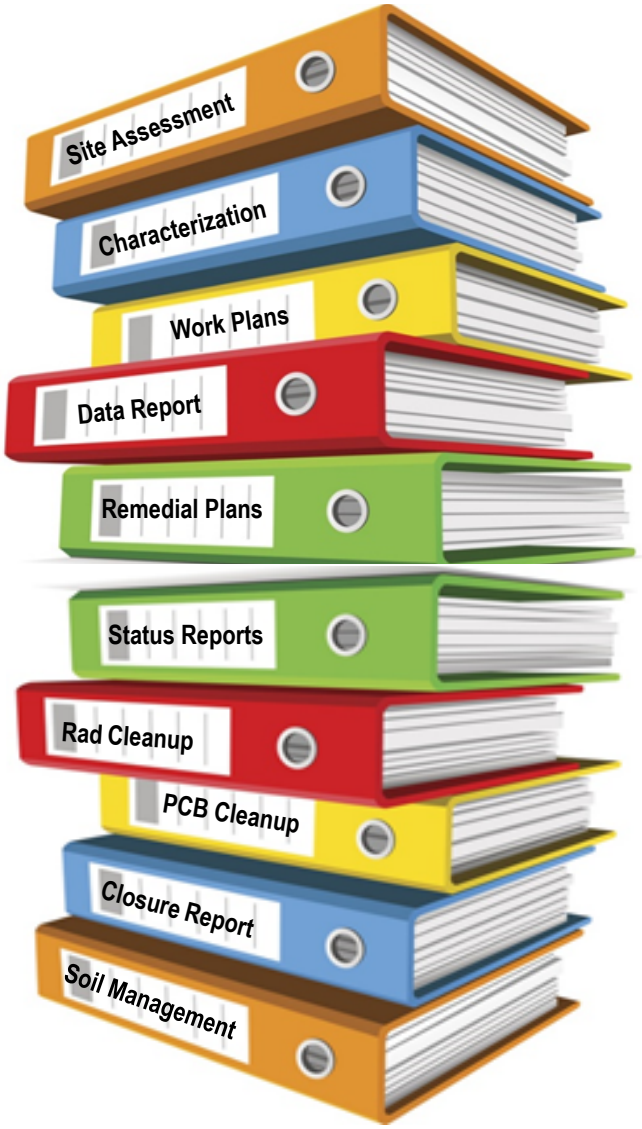
- Historical program
- Goals and objectives
- Benefits
- Current portfolio
- Questions

Clean-up Goals

- Be good stewards of the environment
- Safely retire underutilized obsolete facilities
- Make ready for brownfield development
- Position Berkeley Lab for future investment
- Reduce operating costs

Recent History – Cleanup by the Numbers

- Over a dozen outdated structures removed
- 186,450 gross square feet (over 4.25 acres)
- 8,992 tons environmentally impacted debris and soils removed from LBNL for disposal since September 2015



Hazards That We Address in Cleanup

Constituent	Regulatory Agency	Cleanup Thresholds
Radiological		
VOCs/TPH/Metals		
PCBs		

Abbreviations:

VOCs = Volatile Organic Carbons
TPH = Total Petroleum Hydrocarbons
PCBs = Polychlorinated Biphenyls

Regulatory Oversight

Constituent	Regulatory Agency	Cleanup Thresholds
Radiological	DOE	
VOCs/TPH/Metals	DTSC	
PCBs	EPA	

Abbreviations:

DOE = US Department of Energy
DTSC = California State Department of Toxic Substances Control
EPA = US Environmental Protection Agency

Regulatory Oversight

Constituent	Regulatory Agency	Cleanup Thresholds
Radiological	DOE	Derived Concentration Guideline Levels and controls
VOCs/TPH/Metals	DTSC	Industrial Land-Use levels and controls
PCBs	EPA	Industrial Land-Use levels and controls

Note:

Regulatory agency approved standards based on risk assessments that are protective of the worker, the public, and the environment.

Controls During and After Cleanup

Physical Controls:

Project fencing and posting, soil covers, permanent capping, berms, storm water collection and treatment, dust suppression

Administrative controls:

Site Management Plans for soil, storm water, groundwater

Environmental monitoring:

Ambient air, storm water, creek water, groundwater, soil, soil vapor

Additional Requirements

Constituent	Regulatory Agency	Requirements	Notes
Asbestos Containing Material	BAAQMD	Compliance with BAAQMD regulations:	Building or structure demolition procedures, air monitoring and emissions testing
Lead Dust	BAAQMD	Compliance with BAAQMD regulations	Air monitoring and emission limits
Lead Paint	Cal-OSHA; EPA	Abatement Regulations	
Storm Water	WB	Compliance with WB permit	Project >1 acre requires constructions permit; project <1 acre subject to LBNL's industrial permit
Discharges to sanitary sewer	EBMUD	Compliance with EBMUD permit	Periodic discharge monitoring and reporting
Radiological Air Emissions	EPA	Compliance with air monitoring and emission limits	

Abbreviations:

BAAQMD = Bay Area Air Quality Management District
EBMUD = East Bay Municipal Utility District
EPA = US Environmental Protection Agency
WB= California State Water Resources Control Board
NESHAPS = National Emissions Standards for Hazardous Air Pollutants

Stewardship Guides Our Execution of Cleanup

- A core value for Berkeley Lab
- Critically important to our scientific mission to assure that this cleanup work is carried with highest level of quality

Multiple Layers of Oversight

- Complete work with qualified contractors
  - with internal quality control systems

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- Berkeley Lab subject matter experts provide periodic reviews/audits of contractor work
  - Multiple checks for higher risk activities

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- DOE internal reviews/audits to validate compliance
- Inspections/reviews by independent regulatory agencies

Quality Control Reviews and Inspections

Waste bulk bag scan to verify clean exterior surface

Waste shipping data verification

Old Town Cleanup

Accomplishments:

- Removed ten (10) legacy structures and related environmental issues
- Constructed new science buildings, Chu Hall and GPL, on a portion of the old footprints
- Presently working on soil remediation on former building footprints (5, 16, 16A)

Next Steps:

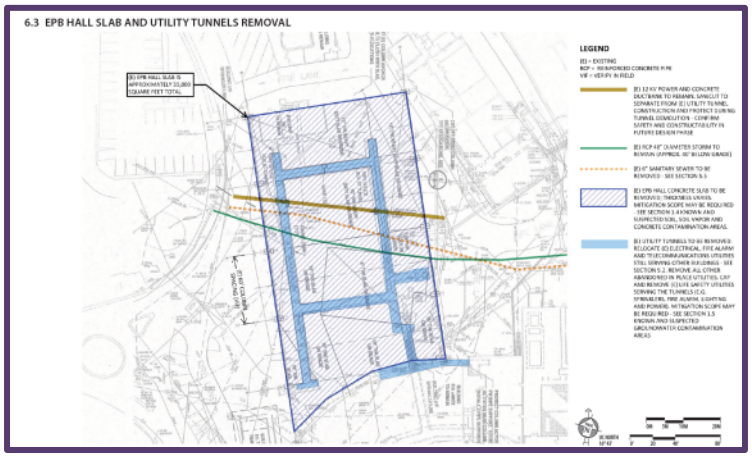
- Remove structures, and evaluate and remediate soils for buildings 4, 7, 7C & 14 (current and future funding)
- Obtain cleanup funding and authorization

Old Town Cleanup – Strategic Investment

Plan Year	Scope	Cleanup Funding ($M)	Future Funding Need ($M)
Pre-FY14	Deactivate and demo buildings 25, 25A/B, 40, 41, 52, 52A, and trailers 90B, 90F, 90G		
FY14-18	Deactivate and demo structures and remediate soils at buildings 5, 16, 16A	58.5	
FY19 and beyond	Deactivate and demo structures and remediate soils on footprint at buildings 4, 7, 7C, and 14		50-70*

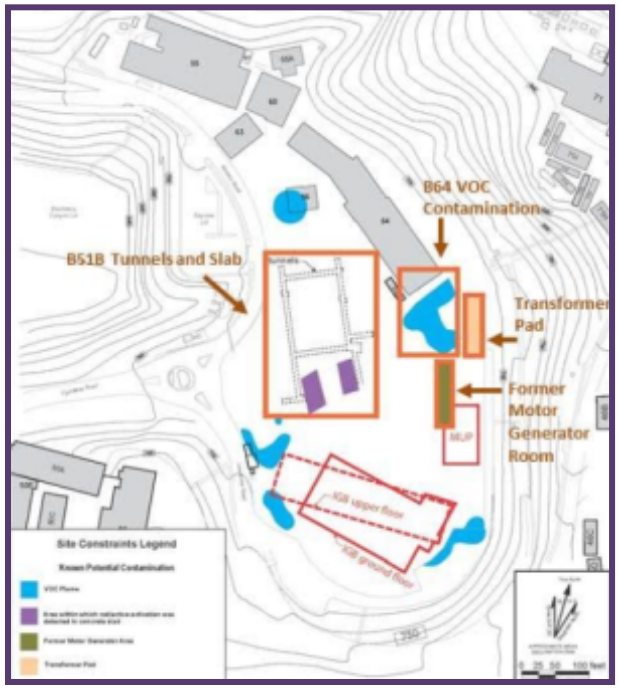
** Preliminary estimate*

Bayview Cleanup



Cleanup and Planning to date:

- Deactivated and removed Bevatron and beamline hall (B51) – 2008 thru 2012
- Performed historical site assessment of utility tunnels
- Commenced VOC Soil Vapor field study and tunnel removal /conceptual planning



Next Objective:

- Address existing utilities
- Deactivate and remove
- tunnels
- Obtain cleanup funding and authorization
- Perform environmental characterization and remediation on 4 areas of concern

Bayview Cleanup – Strategic Investment

Plan Year	Scope	Cleanup Funding ($M)	Future Funding Need ($M)
Completed	Deactivate and demo Bevatron and beamline hall (Building 51)		
FY18	Plan, Characterize, Deactivate and Prep to Demo Tunnels	2-5	
FY19 and beyond	Address legacy issues in key Bayview locations - Demo Tunnels - Investigate environmental areas		30*
	Other future Bayview related cleanup		tbd

** Preliminary estimate*

Challenges

- Manage expansion of scope
- Manage integration with scientific research
- Evaluate options to reduce truck traffic
- Maintain focus on safety!

Summary

Berkeley Lab's long history of infrastructure renewal is of strategic significance to DOE's mission, and enables world-leading science that addresses and provides solutions to the nation's - and the world's - most pressing energy and environmental challenges.

Questions?


Thank You